

=====

Sequence Listing was accepted.

If you need help call the Patent Electronic Business Center at (866)
217-9197 (toll free).

Reviewer: Anne Corrigan

Timestamp: [year=2008; month=12; day=27; hr=11; min=51; sec=5; ms=21;]

=====

Application No: 10553097 Version No: 3.0

Input Set:

Output Set:

Started: 2008-12-11 16:54:53.630
Finished: 2008-12-11 16:54:54.809
Elapsed: 0 hr(s) 0 min(s) 1 sec(s) 179 ms
Total Warnings: 2
Total Errors: 0
No. of SeqIDs Defined: 9
Actual SeqID Count: 9

Error code	Error Description
W 213	Artificial or Unknown found in <213> in SEQ ID (8)
W 213	Artificial or Unknown found in <213> in SEQ ID (9)

SEQUENCE LISTING

<110> National Renewable Energy Laboratory

<120> OXYGEN RESISTANT HYDROGENASES AND METHODS FOR DESIGNING AND MAKING SAME

<130> NREL 03-11

<140> 10553097

<141> 2008-12-11

<160> 9

<170> PatentIn version 3.4

<210> 1

<211> 333

<212> PRT

<213> Chlamydomonas reinhardtii

<400> 1

Pro	Val	Ala	Ala	Leu	Lys	Glu	Lys	Ser	His	Ile	Glu	Lys	Val	Gln	Glu
1				5					10					15	

Ala	Leu	Asn	Asp	Pro	Lys	Lys	His	Val	Ile	Val	Ala	Met	Ala	Pro	Ser
		20					25						30		

Val	Arg	Thr	Ala	Met	Gly	Glu	Leu	Phe	Lys	Met	Gly	Tyr	Gly	Lys	Asp
		35					40					45			

Val	Thr	Gly	Lys	Leu	Tyr	Thr	Ala	Leu	Arg	Met	Leu	Gly	Phe	Asp	Lys
	50					55					60				

Val	Phe	Asp	Ile	Asn	Phe	Gly	Ala	Asp	Met	Thr	Ile	Met	Glu	Glu	Ala
65				70					75					80	

Thr	Glu	Leu	Leu	Gly	Arg	Val	Lys	Asn	Asn	Gly	Pro	Phe	Pro	Met	Phe
			85					90						95	

Thr	Ser	Cys	Cys	Pro	Ala	Trp	Val	Arg	Leu	Ala	Gln	Asn	Tyr	His	Pro
		100						105					110		

Glu	Leu	Leu	Asp	Asn	Leu	Ser	Ser	Ala	Lys	Ser	Pro	Gln	Gln	Ile	Phe
		115					120					125			

Gly	Thr	Ala	Ser	Lys	Thr	Tyr	Tyr	Pro	Ser	Ile	Ser	Gly	Ile	Ala	Pro
130						135						140			

Glu Asp Val Tyr Thr Val Thr Ile Met Pro Cys Asn Asp Lys Lys Tyr
145 150 155 160

Glu Ala Asp Ile Pro Phe Met Glu Thr Asn Ser Leu Arg Asp Ile Asp
165 170 175

Ala Ser Leu Thr Thr Arg Glu Leu Ala Lys Met Ile Lys Asp Ala Lys
180 185 190

Ile Lys Phe Ala Asp Leu Glu Asp Gly Glu Val Asp Pro Ala Met Gly
195 200 205

Thr Tyr Ser Gly Ala Gly Ala Ile Phe Gly Ala Thr Gly Gly Val Met
210 215 220

Glu Ala Ala Ile Arg Ser Ala Lys Asp Phe Ala Glu Asn Lys Glu Leu
225 230 235 240

Glu Asn Val Asp Tyr Thr Glu Val Arg Gly Phe Lys Gly Ile Lys Glu
245 250 255

Ala Glu Val Glu Ile Ala Gly Asn Lys Leu Asn Val Ala Val Ile Asn
260 265 270

Gly Ala Ser Asn Phe Phe Glu Phe Met Lys Ser Gly Lys Met Asn Glu
275 280 285

Lys Gln Tyr His Phe Ile Glu Val Met Ala Cys Pro Gly Gly Cys Ile
290 295 300

Asn Gly Gly Gly Gln Pro His Val Asn Ala Leu Asp Arg Glu Asn Val
305 310 315 320

Asp Tyr Arg Lys Leu Arg Ala Ser Val Leu Tyr Asn Gln
325 330

<210> 2

<211> 333

<212> PRT

<213> Chlamydomonas reinhardtii

<400> 2

Pro Val Ala Ala Leu Ser Glu Lys Ser His Met Asp Arg Val Lys Asn
1 5 10 15

Ala Leu Asn Ala Pro Glu Lys His Val Ile Val Ala Met Ala Pro Ser
20 25 30

Val Arg Ala Ser Ile Gly Glu Leu Phe Asn Met Gly Phe Gly Val Asp
35 40 45

Val Thr Gly Lys Ile Tyr Thr Ala Leu Arg Gln Leu Gly Phe Asp Lys
50 55 60

Ile Phe Asp Ile Asn Phe Gly Ala Asp Met Thr Ile Met Glu Glu Ala
65 70 75 80

Thr Glu Leu Val Gln Arg Ile Glu Asn Asn Gly Pro Phe Pro Met Phe
85 90 95

Thr Ser Cys Cys Pro Gly Trp Val Arg Gln Ala Glu Asn Tyr Tyr Pro
100 105 110

Glu Leu Leu Asn Asn Leu Ser Ser Ala Lys Ser Pro Gln Gln Ile Phe
115 120 125

Gly Thr Ala Ser Lys Thr Tyr Tyr Pro Ser Ile Ser Gly Leu Asp Pro
130 135 140

Lys Asn Val Phe Thr Val Thr Val Met Pro Cys Thr Ser Lys Lys Phe
145 150 155 160

Glu Ala Asp Arg Pro Gln Met Glu Lys Asp Gly Leu Arg Asp Ile Asp
165 170 175

Ala Val Ile Thr Thr Arg Glu Leu Ala Lys Met Ile Lys Asp Ala Lys
180 185 190

Ile Pro Phe Ala Lys Leu Glu Asp Ser Glu Ala Asp Pro Ala Met Gly
195 200 205

Glu Tyr Ser Gly Ala Gly Ala Ile Phe Gly Ala Thr Gly Gly Val Met
210 215 220

Glu Ala Ala Leu Arg Ser Ala Lys Asp Phe Ala Glu Asn Ala Glu Leu

225 230 235 240

Glu Asp Ile Glu Tyr Lys Gln Val Arg Gly Leu Asn Gly Ile Lys Glu
245 250 255

Ala Glu Val Glu Ile Asn Asn Asn Lys Tyr Asn Val Ala Val Ile Asn
260 265 270

Gly Ala Ser Asn Leu Phe Lys Phe Met Lys Ser Gly Met Ile Asn Glu
275 280 285

Lys Gln Tyr His Phe Ile Glu Val Met Ala Cys His Gly Gly Cys Val
290 295 300

Asn Gly Gly Gly Gln Pro His Val Asn Pro Lys Asp Leu Glu Lys Val
305 310 315 320

Asp Ile Lys Lys Val Arg Ala Ser Val Leu Tyr Asn Gln
325 330

<210> 3
<211> 321
<212> PRT
<213> Chlamydomonas reinhardtii

<400> 3

Pro Glu Asn Ala Ile Tyr Glu Ala Gln Ser Trp Val Pro Glu Val Glu
1 5 10 15

Lys Lys Leu Lys Asp Gly Lys Val Lys Cys Ile Ala Met Pro Ala Pro
20 25 30

Ala Val Arg Tyr Ala Leu Gly Asp Ala Phe Gly Met Pro Val Gly Ser
35 40 45

Val Thr Thr Gly Lys Met Leu Ala Ala Leu Gln Lys Leu Gly Phe Ala
50 55 60

His Cys Trp Asp Thr Glu Phe Thr Ala Asp Val Thr Ile Trp Glu Glu
65 70 75 80

Gly Ser Glu Phe Val Glu Arg Leu Thr Lys Lys Ser Asp Met Pro Leu
85 90 95

Pro	Gln	Phe	Thr	Ser	Cys	Cys	Pro	Gly	Trp	Gln	Lys	Tyr	Ala	Glu	Thr	100	105	110
Tyr	Tyr	Pro	Glu	Leu	Leu	Pro	His	Phe	Ser	Thr	Cys	Lys	Ser	Pro	Ile	115	120	125
Gly	Met	Asn	Gly	Ala	Leu	Ala	Lys	Thr	Tyr	Gly	Ala	Glu	Arg	Met	Lys	130	135	140
Tyr	Asp	Pro	Lys	Gln	Val	Tyr	Thr	Val	Ser	Ile	Met	Pro	Cys	Ile	Ala	145	150	155
Lys	Lys	Tyr	Glu	Gly	Leu	Arg	Pro	Glu	Leu	Lys	Ser	Ser	Gly	Met	Arg	165	170	175
Asp	Ile	Asp	Ala	Thr	Leu	Thr	Thr	Arg	Glu	Leu	Ala	Tyr	Met	Ile	Lys	180	185	190
Lys	Ala	Gly	Ile	Asp	Phe	Ala	Lys	Leu	Pro	Asp	Gly	Lys	Arg	Asp	Ser	195	200	205
Leu	Met	Gly	Glu	Ser	Thr	Gly	Gly	Ala	Thr	Ile	Phe	Gly	Val	Thr	Gly	210	215	220
Gly	Val	Met	Glu	Ala	Ala	Leu	Arg	Phe	Ala	Tyr	Glu	Ala	Val	Thr	Gly	225	230	235
Lys	Lys	Pro	Asp	Ser	Trp	Asp	Phe	Lys	Ala	Val	Arg	Gly	Leu	Asp	Gly	245	250	255
Ile	Lys	Glu	Ala	Thr	Val	Asn	Val	Gly	Gly	Thr	Asp	Val	Lys	Val	Ala	260	265	270
Val	Val	His	Gly	Ala	Lys	Arg	Phe	Lys	Gln	Val	Cys	Asp	Asp	Val	Lys	275	280	285
Ala	Gly	Lys	Ser	Pro	Tyr	His	Phe	Ile	Glu	Tyr	Met	Ala	Cys	Pro	Gly	290	295	300
Gly	Cys	Val	Cys	Gly	Gly	Gly	Gln	Pro	Val	Met	Pro	Gly	Val	Leu	Glu	305	310	315
																		320

Ala

<210> 4

<211> 393

<212> PRT

<213> Chlamydomonas reinhardtii

<400> 4

Ala Thr Asp Ala Val Pro His Trp Lys Leu Ala Leu Glu Glu Leu Asp
1 5 10 15

Lys Pro Lys Asp Gly Gly Arg Lys Val Leu Ile Ala Gln Val Ala Pro
20 25 30

Ala Val Arg Val Ala Ile Ala Glu Ser Phe Gly Leu Ala Pro Gly Ala
35 40 45

Val Ser Pro Gly Lys Leu Ala Ala Gly Leu Arg Ala Leu Gly Phe Asp
50 55 60

Gln Val Phe Asp Thr Leu Phe Ala Ala Asp Leu Thr Ile Met Glu Glu
65 70 75 80

Gly Thr Glu Leu Leu His Arg Leu Lys Glu His Leu Glu Ala His Pro
85 90 95

His Ser Asp Glu Pro Leu Pro Met Phe Thr Ser Cys Cys Pro Gly Trp
100 105 110

Val Ala Met Met Glu Lys Ser Tyr Pro Glu Leu Ile Pro Phe Val Ser
115 120 125

Ser Cys Lys Ser Pro Gln Met Met Met Gly Ala Met Val Lys Thr Tyr
130 135 140

Leu Ser Glu Lys Gln Gly Ile Pro Ala Lys Asp Ile Val Met Val Ser
145 150 155 160

Val Met Pro Cys Val Arg Lys Gln Gly Glu Ala Asp Arg Glu Trp Phe
165 170 175

Cys Val Ser Glu Pro Gly Val Arg Asp Val Asp His Val Ile Thr Thr
180 185 190

Ala Glu Leu Gly Asn Ile Phe Lys Glu Arg Gly Ile Ile Leu Pro Glu
195 200 205

Leu Pro Asp Ser Asp Trp Asp Gln Pro Leu Gly Leu Gly Ser Gly Ala
210 215 220

Gly Val Leu Phe Gly Thr Thr Gly Gly Val Met Glu Ala Ala Val Arg
225 230 235 240

Thr Ala Tyr Glu Ile Val Thr Lys Glu Pro Leu Pro Arg Leu Asn Leu
245 250 255

Ser Glu Val Arg Gly Leu Asp Gly Ile Lys Glu Ala Ser Val Thr Leu
260 265 270

Val Pro Ala Pro Gly Ser Lys Phe Ala Glu Leu Val Ala Ala Arg Leu
275 280 285

Ala His Lys Val Glu Glu Ala Ala Ala Ala Glu Ala Ala Ala Val
290 295 300

Glu Gly Ala Val Lys Pro Pro Ile Ala Tyr Asp Gly Gly Gln Gly Phe
305 310 315 320

Ser Thr Asp Asp Gly Lys Gly Gly Leu Lys Leu Arg Val Ala Val Ala
325 330 335

Asn Gly Leu Gly Asn Ala Lys Lys Leu Ile Gly Lys Met Val Ser Gly
340 345 350

Glu Ala Lys Tyr Asp Phe Val Glu Ile Met Ala Cys Pro Ala Gly Cys
355 360 365

Val Gly Gly Gly Gly Gln Pro Arg Ser Thr Asp Lys Gln Ile Thr Gln
370 375 380

Lys Arg Gln Ala Ala Leu Tyr Asp Leu
385 390

<210> 5
<211> 386
<212> PRT

<213> Chlamydomonas reinhardtii

<400> 5

Ala Glu Ala Pro Leu Ser His Val Gln Gln Ala Leu Ala Glu Leu Ala
1 5 10 15

Lys Pro Lys Asp Asp Pro Thr Arg Lys His Val Cys Val Gln Val Ala
20 25 30

Pro Ala Val Arg Val Ala Ile Ala Glu Thr Leu Gly Leu Ala Pro Gly
35 40 45

Ala Thr Thr Pro Lys Gln Leu Ala Glu Gly Leu Arg Arg Leu Gly Phe
50 55 60

Asp Glu Val Phe Asp Thr Leu Phe Gly Ala Asp Leu Thr Ile Met Glu
65 70 75 80

Glu Gly Ser Glu Leu Leu His Arg Leu Thr Glu His Leu Glu Ala His
85 90 95

Pro His Ser Asp Glu Pro Leu Pro Met Phe Thr Ser Cys Cys Pro Gly
100 105 110

Trp Ile Ala Met Leu Glu Lys Ser Tyr Pro Asp Leu Ile Pro Tyr Val
115 120 125

Ser Ser Cys Lys Ser Pro Gln Met Met Leu Ala Ala Met Val Lys Ser
130 135 140

Tyr Leu Ala Glu Lys Lys Gly Ile Ala Pro Lys Asp Met Val Met Val
145 150 155 160

Ser Ile Met Pro Cys Thr Arg Lys Gln Ser Glu Ala Asp Arg Asp Trp
165 170 175

Phe Cys Val Asp Ala Asp Pro Thr Leu Arg Gln Leu Asp His Val Ile
180 185 190

Thr Thr Val Glu Leu Gly Asn Ile Phe Lys Glu Arg Gly Ile Asn Leu
195 200 205

Ala Glu Leu Pro Glu Gly Glu Trp Asp Asn Pro Met Gly Val Gly Ser

210

215

220

Gly Ala Gly Val Leu Phe Gly Thr Thr Gly Gly Val Met Glu Ala Ala
 225 230 235 240

Leu Arg Thr Ala Tyr Glu Leu Phe Thr Gly Thr Pro Leu Pro Arg Leu
 245 250 255

Ser Leu Ser Glu Val Arg Gly Met Asp Gly Ile Lys Glu Thr Asn Ile
 260 265 270

Thr Met Val Pro Ala Pro Gly Ser Lys Phe Glu Glu Leu Leu Lys His
 275 280 285

Arg Ala Ala Ala Arg Ala Glu Ala Ala Ala His Gly Thr Pro Gly Pro
 290 295 300

Leu Ala Trp Asp Gly Gly Ala Gly Phe Thr Ser Glu Asp Gly Arg Gly
 305 310 315 320

Gly Ile Thr Leu Arg Val Ala Val Ala Asn Gly Leu Gly Asn Ala Lys
 325 330 335

Lys Leu Ile Thr Lys Met Gln Ala Gly Glu Ala Lys Tyr Asp Phe Val
 340 345 350

Glu Ile Met Ala Cys Pro Ala Gly Cys Val Gly Gly Gly Gly Gln Pro
 355 360 365

Arg Ser Thr Asp Lys Ala Ile Thr Gln Lys Arg Gln Ala Ala Leu Tyr
 370 375 380

Asn Leu
 385

<210> 6

<211> 441

<212> PRT

<213> Chlamydomonas reinhardtii

<400> 6

Ala Ala Pro Ala Ala Glu Ala Pro Leu Ser His Val Gln Gln Ala Leu
 1 5 10 15

Ala	Glu	Leu	Ala	Lys	Pro	Lys	Asp	Asp	Pro	Thr	Arg	Lys	His	Val	Cys	20	25	30
Val	Gln	Val	Ala	Pro	Ala	Val	Arg	Val	Ala	Ile	Ala	Glu	Thr	Leu	Gly	35	40	45
Leu	Ala	Pro	Gly	Ala	Thr	Thr	Pro	Lys	Gln	Leu	Ala	Glu	Gly	Leu	Arg	50	55	60
Arg	Leu	Gly	Phe	Asp	Glu	Val	Phe	Asp	Thr	Leu	Phe	Gly	Ala	Asp	Leu	65	70	75
Thr	Ile	Met	Glu	Glu	Gly	Ser	Glu	Leu	Leu	His	Arg	Leu	Thr	Glu	His	85	90	95
Leu	Glu	Ala	His	Pro	His	Ser	Asp	Glu	Pro	Leu	Pro	Met	Phe	Thr	Ser	100	105	110
Cys	Cys	Pro	Gly	Trp	Ile	Ala	Met	Leu	Glu	Lys	Ser	Tyr	Pro	Asp	Leu	115	120	125
Ile	Pro	Tyr	Val	Ser	Ser	Cys	Lys	Ser	Pro	Gln	Met	Met	Leu	Ala	Ala	130	135	140
Met	Val	Lys	Ser	Tyr	Leu	Ala	Glu	Lys	Lys	Gly	Ile	Ala	Pro	Lys	Asp	145	150	155
Met	Val	Met	Val	Ser	Ile	Met	Pro	Cys	Thr	Arg	Lys	Gln	Ser	Glu	Ala	165	170	175
Asp	Arg	Asp	Trp	Phe	Cys	Val	Asp	Ala	Asp	Pro	Thr	Leu	Arg	Gln	Leu	180	185	190
Asp	His	Val	Ile	Thr	Thr	Val	Glu	Leu	Gly	Asn	Ile	Phe	Lys	Glu	Arg	195	200	205
Gly	Ile	Asn	Leu	Ala	Glu	Leu	Pro	Glu	Gly	Glu	Trp	Asp	Asn	Pro	Met	210	215	220